

ABSTRACT OF THE DISCLOSURE

A first impurity diffusion area is formed in the semiconductor substrate at a bottom of the first trench formed in a surface of the semiconductor substrate. A
5 second impurity diffusion area is formed in the surface of the semiconductor substrate, each have one end contacting a first side wall of the first trench, and each have the same conductive type as the first impurity diffusion area. A first gate electrode is
10 provided on the first side wall between the first and second impurity diffusion areas with a gate insulating film interposed therebetween. A first ferroelectric film is provided on a first lower electrode, which is provided on the second impurity area. A first upper
15 electrode is provided on the first ferroelectric film. A first interconnection layer is provided above the first upper electrode. A first contact plug electrically connects the first interconnection layer and first impurity diffusion area.